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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: William H. Starnes et al.



Examiner: P. A. Szekely

Serial No.: 10/848,802

Group Art Unit: 1714

Filed: 05/19/04

Date: December 18, 2006

For: **ORGANIC THIOL METAL-FREE STABILIZERS AND PLASTICIZERS
FOR HALOGEN-CONTAINING POLYMERS**

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF MAILING

Sir:

The undersigned hereby certifies that the attached **APPEAL BRIEF UNDER 37 CFR §41.37 (ORIGINAL & TWO COPIES) AND CHECK NO. 17082 IN THE AMOUNT OF \$500.00** were mailed to the Commissioner for Patents, Alexandria, VA 22313-1450, with sufficient first-class postage, no special handling, on December 18, 2006 before 5:00 P.M., thereby ensuring that such documents will be in the hands of the U.S. Postal Service by the close of business this day.

The Commissioner is authorized to charge any additional fees or credit any overpayment of fees with regard to the attached document to Deposit Account 08-3150.

Respectfully submitted,

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Appeal Brief (14 pgs.)(Original + 2 Copies)



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BRIEF FOR APPELLANT

Sir:

Appellant has appealed the Final Rejection of August 1, 2006. This Appeal Brief is filed in accordance with 37 CFR § 41.37.

REAL PARTY IN INTEREST

By virtue of an Assignment dated June 19, 2001, by the named inventors, the real party in interest is The College of William and Mary, having an address of P.O. Box 8795, Williamsburg, Virginia 23187-8795. The Assignment has been recorded in the U.S. Patent and Trademark Office on June 7, 2006 at Reel 017752 and Frame 0979.

RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to the Appellant which would affect or have bearing on the Board's decision concerning this Appeal.

STATUS OF CLAIMS

Claims 23-42 are pending in the application and have been rejected. All of said claims are being appealed.

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STATUS OF AMENDMENTS

Appellant's claim amendments presented in Amendment "A" filed June 19, 2006 have been entered by the Examiner. There have been no additional amendments subsequent to the Final Rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The claimed present invention relates to a polymer composition including a chlorine- or bromine-containing polymer and an environmentally friendly heat stabilizer component that, as claimed in independent claim 23, consists of a mercaptosuccinic acid derived organic thiol compound of the formula claimed and optionally epoxidized soybean oil, or as claimed in independent claim 33, the mercaptosuccinic acid derived organic thiol compound with the composition being free of a Lewis acid and a metal-containing stabilizer. The chlorine-containing or bromine-containing polymers are described in the specification on at least page 26, line 8 through page 28, line 3. Examples of suitable polymers include poly(vinyl chloride), poly(vinylidene chloride), poly(vinyl bromide), chlorinated poly(vinyl chloride), and chlorinated natural or synthetic rubber.

Support for the specifically claimed organic thiol compounds is set forth in Formula IIA, page 17, line 24, with further description of the formula limitations described on lines 26 through page 18, line 7. A specific example of a claimed organic thiol compound is disclosed on page 19, line 10. A method for forming the organic thiol compounds is described on page 19, line 19 through page 21, line 5. A detailed example for preparing one of the claimed organic thiol compounds, namely bis(2-ethylhexyl)mercaptosuccinate, is described on page 22, line 22 through page 24, line 2.

Claims 41 and 42 claim that the organic thiol compound is present in an amount from about 25 to about 100 parts per 100 parts by weight of the chlorine-containing or bromine-containing polymer. The claimed limitations are taken directly from the specification on page 28, lines 13-16, and thus are directly supported in the specification as filed.

As described in the Background of the Invention, it is well known that chlorine-containing resins, particularly poly(vinyl chloride) polymers and copolymers, are unstable to heat and light and the physical properties thereof are degraded upon exposure thereto. Degradation or discoloration during processing is particularly undesirable in clear or lightly colored plastics. In the prior art, various metal-based stabilizers such as lead-, cadmium-, and tin-based stabilizers have been developed and utilized. However, environmental pollution caused by the toxicity of the metal residues need to be avoided for the sake of the environment. The organic thiol compounds are free of metal and are not used with any metal-based stabilizers or Lewis acids, see page 25, lines 8-10. Metal-based stabilizers are defined as any metal compound, salt, complex, or the like of any of the metals as set forth in groups 1-8 of the periodic table, see page 25, lines 10-12.

The organic thiols of the claimed invention unexpectedly improve the processing properties of polymers alone, without the use of a metal-based co-stabilizer, providing cost and efficiency improvements to resin processors. The claimed thiols do not cause odor problems associated with the processing of resins stabilized thereby and provide greatly increased resistance to resin yellowing associated with thermal degradation, see page 30, lines 16-21.

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

At issue is whether claims 41 and 42 meet the enablement requirement as set forth under 35 U.S.C. §112, first paragraph.

Further at issue is whether claims 23-40 are patentable under 35 U.S.C. §102(b) or over Henkel KgaA, German Patent No. 32 47 736.

ARGUMENT

Arguments Relating to 35 U.S.C. §112, First Paragraph Rejection of Claims 41-42

It is respectfully submitted that the Examiner has not presented a *prima facie* case of nonenablement. As indicated hereinabove, the application as filed provides adequate support for the claimed invention set forth in the currently pending claims 41

and 42. Namely, at least page 28, lines 4-19, states that the organic thiol compounds can be added to or blended with the described polymers in any suitable amount, generally from about 1 to about 100 parts by weight per 100 total parts by weight of the polymer component, and lines 13-16 state that a flexible composition of the present invention contains from about 25 to about 100 parts of the organic thiol compound per 100 parts of polymer utilized. The Federal Circuit has outlined the general procedures that the Patent Office via the Examiner must implement for a proper determination of whether a patent application complies with the enablement requirements under Section 112, first paragraph. As stated by the Federal Circuit:

"A specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented *must* be taken as in compliance with the enabling requirement of the first paragraph of §112 *unless* there is reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support. . . . Any party making the assertion that a U.S. patent specification or claims fails, for one reason or another, to comply with §112 bears the burden of persuasion in showing said lack of compliance", see Fiers v. Sugano, 984 F.2d 1164, 25 USPQ2d 1601, 1607 (Fed. Cir. 1993).

According, for an application to be enabling, it must explain how to make and use the invention to one of ordinary skill in the art. Thus, specifications need only be reasonable with respect to the art involved, and need not inform the laymen nor disclose what the skilled already possess. It is respectfully submitted that a person of ordinary skill in the relevant art would be able to make and use the claimed invention. The limitations set forth in claims 41 and 42 regarding the weight percentages of the organic thiol compound in relation to the claimed polymers would be understood by one of ordinary skill in the art.

Moreover, the Henkel reference cannot anticipate nor teach the limitations in claims 41 and 42. As set forth on page 10, fourth full paragraph of the Henkel translation, Henkel's compositions contain only 0.02 to 5 parts by weight of the

compounds of Formulas I and II (organic thiol) to 100 parts by weight of the polymerizate, well below Appellant's claimed ranges.

**Arguments Relating to 35 U.S.C. §102(b) Rejection in View of Henkel
German Patent No. 32 47 736 (hereinafter "Henkel")**

The patentability of the claims at issue rests upon an interpretation of the Henkel reference by two educated parties, namely the Examiner and the Appellant. It is respectfully submitted that the Examiner has not presented a *prima facie* case of anticipation and, therefore, the Appellant is deserving of a patent.

The Examiner states that Henkel reveals Applicant's thiol compound in claims 8 and 9 and thiol stabilized halogen-containing polymer in claims 1, 3 and 4 and, therefore Applicants' claims are not novel. The Examiner also states that Henkel is definitely in possession of Applicants' invention if for no other reason that Henkel specifically claims Applicants' invention and that the English translation overlapping pages 6 and 7 and first full paragraph on page 8 state that the claimed thiol compounds are effective stabilizers of PVC by themselves. The Examiner states that he also recognizes that Henkel states that the addition of metal soaps to the thiol stabilization system further improves the stability of PVC, but the reference must be considered for all it discloses and not limited to preferred embodiments or working examples.

The Appellant interprets the Henkel reference in a different manner than the Examiner and respectfully argues that the Henkel reference specifically teaches stabilized compositions must always contain a metal stabilizer and, therefore, Henkel is not in possession of Applicants' claimed compositions absent impermissible hindsight. Independent claim 23 claims a polymer composition of a chlorine-containing or bromine-containing polymer and a heat stabilizer component consisting of the claimed organic thiol and optionally epoxidized soybean oil, thereby excluding metal-containing stabilizers. Likewise, independent claim 33 claims a polymer composition containing the noted polymer, the noted organic thiol, and wherein the composition is free of a Lewis acid and a metal-containing stabilizer.

The basic teachings of the Henkel reference are disclosed in Henkel's own words as follows, with emphasis being added by the Appellant via underlining. The following quote from Henkel is taken from page 15, second full paragraph of the translation.

"In the simplest scenario, the stabilizer combination for polyvinyl chloride molding compounds in accordance with the invention is comprised of a primary stabilizer which is selected from the group which consists of metal soaps, aromatic metal carboxylates, and metal phenolates, and a compound of Formula I or II."

The above passage, in addition to the teachings set forth in the remainder of the Henkel document, namely the specification, claims, and examples show that Henkel was not in possession of the Appellant's claimed invention, which is free of a metal-based stabilizer. In Henkel's own words, his simplest teaching or vision of his invention requires both a metal-containing stabilizer and an organic thiol.

Accordingly, it is respectfully submitted that the Henkel reference does not anticipate the claimed invention and does not teach the use of the claimed organic thiol stabilizer without the use of a metal-containing stabilizer. Also, the *prima facie* case of anticipation also requires that the prior art reference relied on be interpreted by one of ordinary skill in the art. The reference must be interpreted in its entirety, and not only isolated portions of the reference relied upon. The Federal Circuit has stated "A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." W. L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). In *In re Wesslau*, the Court of Customs and Patent Appeals cautioned that "it is impermissible within ...to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art." 353 F.2d at 241, 147 USPQ at 393. In Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 796 F.2d 443, 230 USPQ 416 (Fed. Cir. 1986), cert. denied, 484 U.S. 823 (1987), on remand, 10 USPQ 2d 1929 (N.D. Calif. 1989), the Federal Circuit held that a single line in a prior art reference should not be taken out of context and relied upon with the benefit of hindsight to show obviousness. Rather, a reference

should be considered as a whole, and portions arguing against or teaching away from the claimed invention must be considered. Moreover, according to Markman v. Westview Instruments, 52 F.3d 967, 979-980, 34 USPQ 2D 1321, 1329 (Fed. Cir. 1995), aff'd, 517 U.S. 370, 134 L. Ed. 2d 577, 116 S. Ct. 1384 (1996), "claims must be read in view of the specification, of which they are a part."

In the introductory section of the Henkel reference on page 5, third full paragraph, Henkel states that inorganic and organic lead salts, organic antimony compounds and organotin compounds are used as heat stabilizers for polyvinyl chloride and the mentioned metal compounds are usually described as primary stabilizers. In describing the "Background of the Invention" on page 6, bottom of the first full paragraph, Henkel states "there is a need for substances with the assistance of which the initial and/or the long-term effect of such stabilizer systems can be decisively improved."

Henkel, on page 7, lines 2-6, states that it has been found "these mercapto compounds are capable of enhancing the stabilizing effect of primary stabilizers ...". (emphasis added). Further describing his invention beginning in the last paragraph on page 7, Henkel states that stabilized molding compounds "contain a stabilizer combination of (1) primary stabilizers selected from the group consisting of metal soaps, aromatic metal carboxylates, and metal phenolates, as well as (2) costabilizers, characterized in that they contain compounds of the Formulas I and II as costabilizers." The first full paragraph on page 8 further discusses the polyvinyl chloride molding compounds containing primary stabilizers that are metal-based and, organic thiols as costabilizers.

The relative amounts of the stabilizer combinations are described in the last paragraph on page 10 continuing through the second paragraph on page 11. The metal soaps, aromatic metal carboxylates and metal phenolates may be present in quantities of 0.05 to 5 parts by weight per 100 parts weight of the polymerizate. Henkel does not state that the metal-based stabilizers are optional, or may be absent from the composition. Special configurations of the invention are set forth in the first paragraph on page 11 wherein it is stated that 0.1 to 3 parts by weight of calcium soap and/or 0.1 to 3 parts by weight of barium soap, and/or 0.1 to 3 parts by weight of zinc soap to 100

parts by weight of the polymerizate can be used with a total percentage of metal soaps not normally exceeding 3 parts by weight per 100 parts by weight of the polymerizate. The second full paragraph on page 11 states that 0.2 to 5 parts of sodium aluminosilicate may be added to 100 parts by weight of the polymerizate.

The process for forming the polyvinyl chloride molding compounds is described on page 15, first full paragraph of Henkel. It is stated that the compounds "can be combined by mixing the components in conventional mixers. In this process, it is possible to initially mix the various components of the stabilizer combination with each other, and then to combine this mixture with the polyvinyl chloride base material. (emphasis added)

Special configurations of the stabilizer combinations are also described on page 15, third full paragraph through the fourth full paragraph of page 16.

In the Example section, Henkel first describes preparing organic thiol compounds from the last full paragraph on page 16 through the first two lines on page 18. As stated on page 18, first full paragraph, the effect of the stabilizer combination was tested and the polyvinyl chloride molding compounds containing stabilizer mixtures were processed into test sheets and tested.

Each and every example utilized a stabilizer combination of a metal-containing stabilizer as well as an organic thiol compound in accordance with Henkel's "simplest scenario."

As set forth in Table I relating to Example 1, Examples A through F all contain calcium stearate and zinc stearate in combination with the organic thiol. In Example 2, Examples G through L all contain calcium stearate and Examples I, J and L additionally include aluminosilicate, see also Table II. Finally, Example 3 utilizes as a combination the metal-based stabilizers zinc stearate and barium stearate as metal base stabilizers in the stabilizer combination with the Henkel organic thiol.

If Henkel was in possession of Appellant's invention, at least one of the Examples would have utilized the succinate-based organic thiols independently of a metal-containing stabilizer.

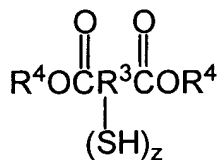
When viewed as a whole, claim 1 of the Henkel reference cannot be interpreted as the Examiner suggests, as Henkel is merely defining the organic thiol compounds preferred to be utilized in the polyvinyl chloride molding compounds. Taken in view of the entire specification including Examples, Henkel clearly sets forth that in the simplest scenario, both metal-containing stabilizers and the organic thiol compounds are to be utilized in combination in the polyvinyl chloride molding compounds.

In summary, it is respectfully submitted that, according to statute, as well as the case law, the Henkel reference, when taken as a whole, from the weight of the evidence presented, cannot anticipate, nor teach or suggest the Appellant's claimed invention.

CLAIMS APPENDIX

1-22. (Canceled)

23. (Previously Presented) A polymer composition comprising:
a chlorine-containing or bromine-containing polymer; and
a heat stabilizer component consisting of a) an organic thiol compound having the formula:



wherein R³ is an alkylene having 2 carbon atoms, each R⁴, independently, is a straight chain or branched alkyl having from 1 to about 20 carbon atoms, and z is 1 or 2, and optionally b) epoxidized soybean oil.

24. (Previously Presented) The polymer composition according to claim 23, wherein each R⁴ has from 2 to about 10 carbon atoms.

25. (Previously Presented) The polymer composition according to claim 23, wherein each R⁴ is 2-ethylhexyl, methyl, ethyl, propyl, butyl, hexyl or decyl.

26. (Previously Presented) The polymer composition according to claim 25, wherein z is 1.

27. (Previously Presented) The polymer composition according to claim 23, wherein said polymer is poly(vinyl chloride), poly(vinylidene chloride), poly(vinyl bromide), poly(vinylidene bromide), chlorinated poly(vinyl chloride), chlorinated polyethylene, chlorinated natural or synthetic rubber, polychloroprene, rubber hydrochloride, chlorinated polystyrene, or copolymers thereof, or combinations thereof.

28. (Previously Presented) The polymer composition according to claim 26, wherein said polymer is poly(vinyl chloride), poly(vinylidene chloride), poly(vinyl bromide),

poly(vinylidene bromide), chlorinated poly(vinyl chloride), chlorinated polyethylene, chlorinated natural or synthetic rubber, polychloroprene, rubber hydrochloride, chlorinated polystyrene, or copolymers thereof, or combinations thereof.

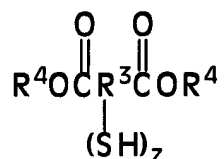
29. (Previously Presented) The polymer composition according to claim 23, wherein said composition includes said epoxidized soybean oil in an amount from about 1 to about 30 parts by weight per 100 parts by weight of said polymer.

30. (Previously Presented) The polymer composition according to claim 28, wherein said composition includes said epoxidized soybean oil in an amount from about 1 to about 30 parts by weight per 100 parts by weight of said polymer.

31. (Previously Presented) The polymer composition according to claim 23, wherein each R⁴ is 2-ethylhexyl and z is 1.

32. (Previously Presented) The polymer composition according to claim 31, wherein said polymer is poly(vinyl chloride), poly(vinylidene chloride), poly(vinyl bromide), poly(vinylidene bromide), chlorinated poly(vinyl chloride), chlorinated polyethylene, chlorinated natural or synthetic rubber, polychloroprene, rubber hydrochloride, chlorinated polystyrene, or copolymers thereof, or combinations thereof.

33. (Previously Presented) A polymer composition, comprising:
a chlorine-containing or bromine-containing polymer; and
a heat stabilizer component comprising an organic thiol compound having the formula:



wherein R³ is an alkylene having 2 carbon atoms, each R⁴ independently, is a straight chain or branched alkyl having from 1 to about 20 carbon atoms, and z is 1 or 2,

said organic thiol compound being present in an amount from about 1 to about 100 parts by weight per 100 parts by weight of said polymer, and said composition being free of a Lewis acid and a metal-containing stabilizer.

34. (Previously Presented) The polymer composition according to claim 33, wherein each R^4 has from 2 to about 10 carbon atoms.

35. (Previously Presented) The polymer composition according to claim 33, wherein each R^4 is 2-ethylhexyl, methyl, ethyl, propyl, butyl, hexyl or decyl.

36. (Previously Presented) The polymer composition according to claim 35, wherein z is 1.

37. (Previously Presented) The polymer composition according to claim 33, wherein said polymer is poly(vinyl chloride), poly(vinylidene chloride), poly(vinyl bromide), poly(vinylidene bromide), chlorinated poly(vinyl chloride), chlorinated polyethylene, chlorinated natural or synthetic rubber, polychloroprene, rubber hydrochloride, chlorinated polystyrene, or copolymers thereof, or combinations thereof.

38. (Previously Presented) The polymer composition according to claim 36, wherein said polymer is poly(vinyl chloride), poly(vinylidene chloride), poly(vinyl bromide), poly(vinylidene bromide), chlorinated poly(vinyl chloride), chlorinated polyethylene, chlorinated natural or synthetic rubber, polychloroprene, rubber hydrochloride, chlorinated polystyrene, or copolymers thereof, or combinations thereof.

39. (Previously Presented) The polymer composition according to claim 33, wherein each R^4 is 2-ethylhexyl and z is 1.

40. (Previously Presented) The polymer composition according to claim 39, wherein said polymer is poly(vinyl chloride), poly(vinylidene chloride), poly(vinyl bromide), poly(vinylidene bromide), chlorinated poly(vinyl chloride), chlorinated

polyethylene, chlorinated natural or synthetic rubber, polychloroprene, rubber hydrochloride, chlorinated polystyrene, or copolymers thereof, or combinations thereof.

41. (Previously Presented) The polymer according to claim 23, wherein the organic thiol compound is present in an amount from about 25 to about 100 parts per 100 parts by weight of the chlorine-containing or bromine-containing polymer.

42. (Previously Presented) The polymer according to claim 33, wherein the organic thiol compound is present in an amount from about 25 to about 100 parts per 100 parts by weight of the chlorine-containing or bromine-containing polymer.

EVIDENCE APPENDIX

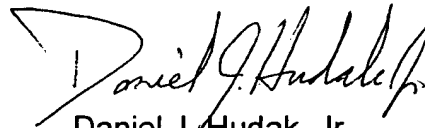
Not Applicable.

RELATED PROCEEDINGS APPENDIX

Not Applicable.

Respectfully submitted,

HUDAK, SHUNK & FARINE CO. L.P.A.

A handwritten signature in black ink, appearing to read "Daniel J. Hudak, Jr.", with a stylized, cursive script.

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